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Alon Slapak

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EXAMINER

PAUL, DISLER

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/573,060	<b>Applicant(s)</b> SLAPAK ET AL.	
	<b>Examiner</b> DISLER PAUL	<b>Art Unit</b> 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-13; 16-17, 19-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wan (US 5,978,489) and Wright (US 2003/0103635 A1).

Re claim 1, Wan disclose of the active noise control system for controlling noise produced by a noise source, said system comprising: an acoustic sensor to sense a noise pattern and to produce a noise signal corresponding to the sensed noise pattern and an acoustic transducer to produce a noise destructive pattern based on said noise signal (fig. 1; col.1 line 40-50; col.2 line 30-60).

But, Wan fail to disclose of an estimator to produce a predicted noise signal by applying an estimation function to said noise signal; and to produce a noise destructive pattern based on said predicted noise signal. But, Wright et al. disclose of a system wherein the similar concept of having the predicted noise signal by applying an estimation function to said noise signal; and to produce a noise destructive pattern based on said predicted noise signal (fig.1-2;

Art Unit: 2615

par[0038-0042,0071-0072, 0085]) for purpose of cancelling noise in large area and outdoor/unconfined locations. Thus, taking the combined teaching of Wan and Wright et al. as a whole, it would have been obvious for one of the ordinary skill in the art to have modify Wan with the predicted noise signal by applying an estimation function to said noise signal; and to produce a noise destructive pattern based on said predicted noise signal for purpose of cancelling noise in large area and outdoor/unconfined locations.

Re claim 2, the system of claim 1, wherein said estimator is able to adapt one or more parameters of said estimation function based on a noise error at a predetermined location (fig.1-2; par [0069-0070]).

Re claim 3, the system of claim 2, wherein said noise error comprises an anticipated destructive interference between said noise pattern and said noise destructive pattern at said predetermined location (fig.1-2; par [0022-3,0078])/all including error within such plance).

RE claim 4, the system of claim 2 comprising an error-sensing microphone to sense said noise error at said predetermined location. (see, claim 2 rejection).

Re claim 5, the system of claim 2 comprising an error evaluator to evaluate said noise error based on said noise signal and said

Art Unit: 2615

predicted noise signal (fig.1-2; par [0069,0073]/update based on noise and predict).

Re claim 6, the system of claim 5, wherein said error evaluator comprises: a speaker transfer function module to produce an estimation of said noise destructive pattern by applying a speaker transfer function to said predicted noise signal; a modulation transfer function module to produce an estimation of said noise pattern at said predetermined location by applying a modulation transfer function to said noise signal; and a subtractor to subtract the estimation of said noise destructive pattern from the estimation of said noise pattern (fig.2; par [0069,0070]).

Re claim 7, the system of claim 2, wherein said estimator is able to adapt said one or more parameters based on a predetermined criterion (par [0070]).

Re claim 8, the system of any one of claim 7, wherein said estimator is able to reduce said error value by adapting said one or more parameters (fig.1-2; wt error mic; par [0035,0069-0070]/to have error at minimum).

Re claim 9, the system of claim 8, wherein said adaptive estimator is able to minimize said error value by adapting said one or more parameters (see claim 8 rejection).

Art Unit: 2615

Re claim 10, the system of claim 2, with the parameters as disclosed , wherein said one or more parameters comprise at least one parameter selected from the group consisting of a center parameter, an effective radius parameter, and an intensity parameter (par [0070]/with radius parameter).

Re claims 11, the system of claim 10, wherein said estimator is able to adapt the estimated parameters, but, the combined teaching of Wan and Wright et al. as a whole, fail to disclose of the specific wherein having a center parameter based on the following equation: 
$$c_k(n+1) = c_k(n) - \mu_c \cdot e(n) \cdot w_k \cdot s = 0 \cdot S - 1 \cdot \text{STF} \cdot f_k(s) \cdot [n-s] \cdot (1 - \epsilon_k) \cdot i = 0 \cdot L - 1 \cdot (x(n-i) - c_k(i))$$
 wherein  $c_{k(n+1)}$  denotes an adapted value of said center parameter,  $c_{k(n)}$  denotes a current value of said center parameter,  $w_{k(n)}$  denotes said intensity parameter,  $L$  denotes a predetermined number of samples of said noise signal,  $\text{STF}$  denotes a predetermined speaker transfer function,  $S$  denotes a predetermined speaker transfer function frequency parameter,  $\mu_c$  denotes a predetermined convergence parameter corresponding to said center parameter,  $v_k$  denotes said effective radius parameter,  $e(n)$  denotes said noise error,  $f_k$  denotes a predetermined function,

Art Unit: 2615

and  $x(n)$  denotes an  $n$ -th sample of said noise signal. However, official notice is taken the concept of having the above equation for defining the center parameters is simply a conversion of well known algorithm formula for defining the center parameter, thus, it would have been obvious for one of the ordinary skill in the art to have modified the combined teaching of Wan and Wright et al. as a whole, with the having the specific wherein having a center parameter based on the following equation:

$$c_k(n+1) = c_k(n) - \mu \cdot c \cdot e(n) \cdot w_k \cdot s = 0 \text{ } S - 1 \cdot \text{times. } \cdot \text{times. } STF \cdot \text{function. } (s) \cdot \text{times. } f_k \cdot \text{function. } [n - s] \cdot \text{times. } (1 \cdot \text{epsilon. } k \cdot \text{times. } i = 0 \text{ } L - 1 \cdot \text{times. } \cdot \text{times. } (x \cdot \text{function. } (n - i) - c_k \cdot \text{function. } (i)))$$

for obtaining the noise reduction signal.

Similarly Re claim 12-13 with respect to radius and intensity parameters have been analyzed and rejected with respect to claim 11.

Re claim 16, the system claim 1, wherein said acoustic sensor comprises a microphone (wan, fig.1 wt (12)).

Re claim 17, the system of claim 1, wherein said acoustic transducer comprises a speaker (Wan, fig.1 wt (14)).

Re claim 19, the system of claim 18 with the controller, but, Wan fail to disclose of the specific wherein said controller comprises: a

Art Unit: 2615

primary estimator to produce a predicted primary signal by applying a primary estimation function to said primary noise signal; and at least one secondary estimator to produce at least one predicted secondary signal by applying at least one secondary estimation function to said at least one secondary noise signal, respectively. But, Wright et al. disclose of the specific wherein said controller comprises: a primary estimator to produce a predicted primary signal by applying a primary estimation function to said primary noise signal; and at least one secondary estimator to produce at least one predicted secondary signal by applying at least one secondary estimation function to said at least one secondary noise signal, respectively (fig.1-2 wt (5,3)/mic and error microphone with noise represented; par [0069]) for purpose of for purpose of cancelling noise in large area and outdoor/unconfined locations. Thus, taking the combined teaching of Wan and Wright et al. as a whole, it would have been obvious for one of the ordinary skill in the art to have modify Wan with the specific wherein said controller comprises: a primary estimator to produce a predicted primary signal by applying a primary estimation function to said primary noise signal; and at least one secondary estimator to produce at least one predicted secondary signal by applying at least one secondary estimation function to said at least one secondary noise signal, respectively for purpose of for purpose of cancelling noise in large area and outdoor/unconfined locations.



Art Unit: 2615

Re claim 20, the system of claim 19, wherein said primary estimator is able to iteratively adapt one or more parameters of said primary estimation function based on a noise error (fig.102 wt (3); par [0069-0070])).

Re claim 21, the system of claim 19, wherein said at least one secondary estimator is able to iteratively adapt one or more parameters of said at least one secondary estimation function, respectively, based on a noise error (fig.102 wt (5); par [0069-0070])).

Re claim 22, the system claim 19, wherein said controller is able to control said acoustic transducer based on a combination of said predicted primary signal and said at least one predicted secondary signal (fig.2, par [0069-0070])).

Re claim 23, the system of claim 22, wherein said controller is able to control said acoustic transducer based on the sum of said predicted primary signal and said at least one predicted secondary signal (see claim 22 rejection).

Re claim 24, the system claim 20, wherein said controller comprises a noise error evaluator to evaluate said noise error (fig.1-3 wt (3); par [0020])).

Art Unit: 2615

Re claim 25, the system of claim 24, wherein said noise error evaluator is able to evaluate said noise error based on said primary noise signal, said at least one secondary noise signal and said predicted primary signal (fig.3 wt (3)/primary, predict and secondary noise).

26. The system of claim 25, wherein said noise error evaluator comprises: a speaker transfer function module to produce an estimation of a primary part of said noise destructive pattern corresponding to said predicted primary signal by applying a speaker transfer function to said predicted primary signal; a modulation transfer function module to produce an estimation of said noise pattern by applying a modulation transfer function to a combination of said primary noise signal and said at least one secondary noise signal; and a subtractor to subtract the estimation of the primary part of said noise destructive pattern from the estimation of said noise pattern (see claim 6 rejection).

Re claim 27, the system of claim 24, wherein said controller comprises at least one residual noise evaluator to evaluate at least one residual noise (par [0045]).

Re claim 28, the system of claim 27, wherein said at least one residual noise evaluator is able to evaluate said residual noise based

Art Unit: 2615

on said noise error and said at least one predicted secondary signal, respectively[fig.2; par [0045]/wt feedback}.

Re claim 29, the system of claim 28, wherein said residual error evaluator comprises: a speaker transfer function module to produce an estimation of a secondary part of said noise destructive pattern corresponding to said predicted secondary signal by applying a speaker transfer function to said predicted secondary signal; a subtractor to subtract the estimation of the secondary part of said noise destructive pattern from said noise error (fig.1 wt (2-3); par [0069-0070]/wt error subtract with speaker for secondary signal).

3. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wan (US 5,978,489) and Wright (US 2003/0103635 A1) and further in view of Wang (US 5,812,973).

Re claim 14, the system of claim 1 with the estimation function, but, the combined teaching of Wan and Wright et al. as a whole, fail to disclose of the wherein said function comprises a non-linear function. But, Wang disclose of a system wherein similar concept having a function wherein the function comprises a non-linear function (col.5 line 30-45) for purpose of determining accurately the feature of a set of samples of spoken word. Thus, taking the combined teaching of Wan

Art Unit: 2615

and Wright and now Wang as a whole, it would have been obvious for one of the ordinary skill in the art to have modify Wang with the similar concept having a function wherein the function comprises a non-linear function for purpose of determining accurately the feature of a set of samples of spoken word.

Re claim 15, the system of claim 14, wherein said non-linear function comprises a radial basis function (col.5 line 30-45).

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 18, 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Wan (US 5,978,489).

Re claim 18, Wan disclose of the active noise control system for controlling a noise produced by a noise source, said system comprising: a primary acoustic sensor to sense a noise pattern and to produce a corresponding primary noise signal ; at least one secondary acoustic sensor to sense a residual noise pattern and to produce at least one secondary noise signal corresponding to the residual noise

Art Unit: 2615

pattern sensed by said at least one secondary microphone, respectively (fig.1 wt (12,16); col.2 line 45-60), wherein said secondary acoustic sensor is separated from said noise source by a distance larger than a distance between said primary acoustic sensor and said noise source (col.2 line 35-55; fig.1 wt (12,16)/pick up by first microphone and propagate down to be pick up by secondary sound mic) and a controller to control an acoustic transducer to produce a noise destructive pattern based on said primary noise signal and said at least one secondary noise signal(fig.1 wt (10,14)).

Re claim 30, the system of claim 18, wherein at least one of said primary acoustic sensor and said at least one secondary acoustic sensor comprises a microphone (fig.1 wt (12,16); col.2 line 35-39 & line 47-49).

Re claim 31, the system of claim 18, wherein said acoustic transducer comprises a speaker (fig.1 wt (14); col.2 line 46-47)

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DISLER PAUL whose telephone number is (571)270-1187. The examiner can normally be reached on 7:30-5:00.

Art Unit: 2615

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. P./  
Examiner, Art Unit 2615

/Vivian Chin/  
Supervisory Patent Examiner, Art Unit 2615